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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,587	09/18/2003	Shuming Nie	50508-1100	1656

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EXAMINER	
YU, MELANIE J	

ART UNIT	PAPER NUMBER
1641	

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/666,587	NIE ET AL.	
	Examiner	Art Unit	
	Melanie Yu	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,6,7,9-27 and 29-110* is/are pending in the application.

4a) Of the above claim(s) *30-52,59-96 and 99-110* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,6,7,9-27,29,97 and 98* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 September 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/23*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application. Applicant's submission filed on 21 April 2005 has been entered.

Election/Restrictions

Applicant's amendment filed 21 April 2005 requires a new restriction requirement to be issued.

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-3, 6-7, 9-28, 29, 53-58 and 97-98 are drawn to a structure comprising a first, nonporous structure, classified in class 436, subclass 518.

II. Claims 59-73 and 99-101 are drawn to a structure comprising a silica material with a hydrocarbon-derivatized surface, classified in class 436, subclass 527.

III. Claims 74-96 are drawn to a structure consisting essentially of a nanospecies, classified in class 436, subclass 524.

IV. Claims 102-110 are drawn to a structure comprising a first structure consisting essentially of a hydrophobic coated semiconductor quantum dot, classified in class 436, subclass 535.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions of each of groups I-IV are patentably distinct. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions have different effects. The structure of group I

requires a first structure to be nonporous, which is not required of the structure of group III, and have a diameter from about 1 to 20 nm, which is not required of the structures of groups II or IV. The structure of group II requires a first structure consisting essentially of a hydrophobic coated semiconductor quantum dot, which is not required of the structure of group I, and a silica material with a hydrocarbon-derivatized surface, which is not required of the structure of groups III or IV. The structure of group IV requires a second structure being a hydrophobic porous material, which is not required of the structure of groups I-III.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification and because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mr. Christopher Linder on 1 June 2005 a provisional election was made without traverse to prosecute the invention of group I, claims 1-29, 53-58 and 97-98. Affirmation of this election must be made by applicant in replying to this Office action. Claims 59-96 and 99-110 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Status of the Claims

1. Claims 30-52, 59-96 and 99-110 are withdrawn from consideration. Claims 1-3, 6, 7, 9-27 and 29-110 are currently pending.

Information Disclosure Statement

2. The information disclosure statement filed 23 September 2004 has been considered by the Examiner. However, the references have already been considered and cited on the notice of references cited mailed on 20 September 2004 and will not be re-entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-3, 6-7, 9-27, 29, 53-58 and 97-98 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Currently amended claims 1 and 53-58 recites a first structure being nonporous and having a diameter from about 1 to 20 nm. It is noted that the instant specification discloses nonporous beads as a second structure at page 20, lines 7-10, but fails to disclose the nonporous beads as being a first structure, and instead discloses the advantage of using a porous material rather than nonporous as a second structure. Regarding the diameter of the first structure, it is noted that the instant specification discloses a semiconductor core ranging from about 1 to 20 nm at page 7, lines 18-20, but fails to teach the entire first structure (ie. quantum dot) as having a diameter from about 1 to 20 nm. New claim 98 recites

each pore configured to include a plurality of non-discretely positioned nanospecies. It is noted that the instant specification discloses a plurality of nanospecies disposed at least within the pores of the porous material at page 3, lines 3-6, but does not provide support for the configuration of each pore to include a plurality of non-discretely positioned nanospecies.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 27 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear whether the probe that is a biomolecule is the same biomolecule that is attached to a fluorophore, or whether there are two biomolecules, one that is a probe and one that is attached to a fluorophore.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

1. Claims 1, 2, 6, 9-11, 19-27, 29, 53-58 and 97-98 rejected under 35 U.S.C. 102(e) as being anticipated by Nie et al.

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Regarding claims 1, 2, 6, 9 and 53-58, Nie et al. teach a plurality of structures (par. Silica microbeads indicates a plurality of structures, par. 0055) comprising: a first, nonporous structure (quantum dot, par. 0054; 0056) having a diameter ranging from 0.5 nm to 30 nm (par. 0041) , which encompasses the recited range of 1-20 nm, disposed within a second structure, wherein the first structure includes a nanospecies having a first characteristic (hydrophobic porous silica, par. 0054; 0056) and a second detectable characteristic (fluorescence, par. 0032), wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same (hydrophobic interior, par. 0056). It is not clear if any further product limitations other than the limitations recited are required of the structure recited in claim 1 in order to cause the porous material to be disposed in the pores of the porous material. Therefore, although Nie et al. seal a porous bead in order to embed quantum dots, the structure is capable of providing the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material causing the nanospecies to interact with the porous material and become disposed in the pores of the porous material because the first characteristic of both the quantum dot and porous structure are the same.

With respect to claims 10 and 11, Nie et al. teach a quantum dot coated with a chemical compound (silane) wherein the quantum dot is hydrophobic after being coated with the chemical compound (par. 0054).

Regarding claims 19-24, Nie et al. teach a quantum dot comprising a core of CdS or CdSe, which are selected from the group of IIB-VIB semiconductors, and a quantum dot cap of ZnS or CdS, which are selected from the group of IIB-VIB semiconductors (par. 0042).

With respect to claims 25-27 and 29, Nie et al. teach a probe bonding directly to the porous material (par. 0058), or indirectly via a linking compound, wherein the linking compound is bonded directly to the porous material (par. 0062). Nie et al. further teach the probe selected from a biomolecule and the biomolecule attached a fluorophore, and a quenching moiety (par. 0086).

Regarding claims 97 and 98, Nie et al. teach the pores having a diameter between about 1 and 20 nm (par. 0029), which falls within the recited range of about 10 to 50 nm. Claim 98, does not appear to recite any further product limitations. Therefore, since Nie et al. teach all product limitations recited in claim1, the structure would be capable of being configured to include a plurality of non-discretely positioned nanospecies.

2. Claims 1, 2, 6, 9, 10, 25-27, 53-58 and 98 is rejected under 35 U.S.C. 102(b) as being anticipated by Chee et al. (US 6,544,732) in light of Nie et al. (2003/0148544) and Jákli et al. (Memory of silica aggregates dispersed in smectic liquid crystals: Effect of the interface properties, 1999, The European Physical Journal B, Vol. 10).

Regarding claims 1, 2, 6, 9, 10 and 53-58, Chee et al. teach a plurality of structures (microspheres indicates a plurality of structures, col. 3, lines 14-20) comprising a first structure

of a quantum dot (col. 13, lines 53-62) disposed within a second structure of porous silica (embedding in porous bead, col. 13, lines 60-62; silica bead, col. 15, lines 43-47), wherein the first structure is nonporous (quantum dots) and has a diameter of less than 30 nm (col. 13, lines 54-56), which encompasses the recited range of about 1 to 20 nm, wherein the first structure includes a nanospecies having a first characteristic (hydrophilic, col. 15, lines 18-20) and a second detectable characteristic, wherein a second detectable energy is produced corresponding to the second detectable characteristic upon exposure to a first energy (optical signature to detect target nucleotide, col. 4, lines 48-54); and wherein the second structure includes a porous silica material (col. 3, lines 34-37), wherein the first characteristic of the nanospecies and the first characteristic of the porous material are the same (both hydrophilic). Chee et al. does not specifically teach the nanospecies being hydrophilic, but does teach a nanocrystal comprising mercaptoacetic acid, which according to Nie et al. at paragraph 54, lines 5-8, renders the nanocrystal hydrophilic. Chee et al. does not specifically teach porous silica material being hydrophilic. However, as evidenced by Jákli et al., a silica bead initially has hydrophilic properties unless treated to have hydrophobic properties (pg. 509, right column, last paragraph). Since Chee et al. does not treat silica beads before attachment, the silica is hydrophilic. Furthermore, Chee et al. do not specifically disclose the interaction of the first characteristic of the nanospecies with the first characteristic of the porous material cause the nanospecies to interact with the porous material and become disposed in the pores of the porous material. It is unclear if further product limitations other than those recited in claim 1 are required for the nanospecies to become disclosed in the porous material. Chee et al. teach the structural

limitations recited in claim 1, and would therefore be capable of interaction between the first characteristic of the nanospecies and the first characteristic of the porous material.

Regarding claim 25, Chee et al. teach a probe bonded directly to the porous material (col. 8, lines 24-43; col. 12, lines 23-29).

With respect to claims 26 and 27, Chee et al. teach a probe bonded indirectly to the porous material (bead) via a linking compound, wherein the linking compound is bonded directly to the porous material (col. 12, lines 23-29). Chee et al. further teach the probe being a biomolecule (bioactive agent, col. 12, lines 23-25; col. 8, lines 44-59; col. 10, lines 13-21) and the biomolecule attached to a fluorophore (label bound to bioactive agent, col. 21, lines 18-38; label can be a fluorophore, col. 16, lines 28-33)

Claim 98, does not appear to recite any further product limitations. Therefore, since Chee et al. teach all product limitations recited in claim1, the structure would be capable of being configured to include a plurality of non-discretely positioned nanospecies.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al and Jákli et al., in view of Thayer et al. (US 6,528,323).

Chee et al. in light of Nie et al and Jákli et al., as applied to claim 1, teach a device comprising a silica structure comprising a nanospecies with a hydrophilic coating, but fail to teach a metal nanoparticle as the nanospecies.

Thayer et al. teach a gold nanoparticle disposed within a porous substrate and attached to a target analyte (col. 15, lines 19-22), in order to facilitate detection.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include a nanospecies with a hydrophilic coating in the device of Chee et al., wherein the nanospecies is a gold particle as taught by Thayer et al., in order to minimize non-specific binding.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in view of Girot et al. (US 5,268,097).

Chee et al., as applied to claim 1, teach a hydrophilic silica structure comprising a hydrophilic semiconductor quantum dot nanospecies, but fail to teach the silica having a hydrocarbon-derivatized surface.

Girot et al. teach a hydrophobic silica porous material having a hydrocarbon-derivatized surface (col. 44, lines 29-31 and 62) in order to stabilize supports and passivate (neutralize) the surface.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the porous silica material of Chee et al., a hydrocarbon-derivatized surface, in order to prevent non-specific binding to the porous silica material.

5. Claims 11-16, 19, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al and Jákli et al., in view of Bawendi et al. (US 6,251,303).

With respect to claim 11, Chee et al. in view of Nie et al. and Jákli et al., as applied to claim 1, teach a hydrophilic quantum dot disposed within a porous material, but fail to teach the quantum dot being hydrophobic.

Bawendi et al. teach a water-soluble hydrophilic semiconductor quantum dot (quantum dot has at least one hydrophilic group, col. 6, lines 21-26) comprising a hydrophobic coating including a hydrophobic compound coated on the semiconductor quantum dot (col. 3, lines 29-35; col. 6, lines 10-13; col. 7, lines 40-56), in order to shield the nanocrystal from its aqueous surroundings.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the structure of Chee et al. in light of Nie et al. and Jákli et al., a soluble hydrophilic quantum dot comprising a hydrophobic coating as taught by Bawendi et al., in order to provide a quantum dot that exhibits high quantum efficiency and so particles remain electronically isolated from one another, and to exhibit quantum dots that are highly luminescent with high quantum efficiency.

Regarding claims 12-16, Bawendi et al. teach a hydrophobic compound being an $O{=}PR_3$ compound, and R is a saturated linear C_4 to C_{18} hydrocarbon (col. 11, lines 16-35)to prevent charge transfer across the region and to maintain the desired isolation between individual quantum dots (col. 6, lines 11-13; col. 7, lines 44-56).

With respect to claims 19, 22 and 24, Chee et al. teach a quantum dot comprising a core of CdSe, and a cap of CdS or ZnS (col. 15, lines 11-15).

6. Claims 20, 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al. and Jákli et al., and in view of Bawendi et al. (US 6,251,303) and further in light of Barth et al. (US 2003/0129810).

Chee et al. in light of Nie et al. and Jákli et al. in view of Bawendi et al., as applied to claim 19, fail to teach a quantum dot core of CdS and a quantum dot cap of ZnS being selected

from a group of IIB-VIB semiconductors, however, CdS and ZnS are part of the group of IIB-VIB semiconductors as evidenced by Barth et al. (par. 100).

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al. and Jákli et al., in view of Bawendi et al., and further in view of Efros et al. (US 6,642,538).

Chee et al. in light of Nie et al. and Jákli et al., in view of Bawendi et al. as applied to claim 11, teach a structure comprising a semiconductor quantum dot coated with a hydrophilic compound and a hydrophilic porous silica material, but fail to teach the quantum dot coated with stearic acid.

Efros et al. teach a semiconductor nanocrystal (quantum dot) passively coated with stearic acid (col. 4, lines 16-44), in order to serve as a natural tunneling barrier.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the device of Chee et al., a quantum dot coated with stearic acid as taught by Efros et al., in order to provide additional stability to the quantum dot by isolating the surface of the active portion of the quantum dot from the effects of the environment and prevent the binding substrate from absorbing a majority of the excitation of the fluorescent label.

8. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al. and Jákli et al., in view of Bawendi et al. and further in view of Damle et al. (Multilayer Langumuir-Blodgett assemblies of hydrophobized CdS nanoparticles by organization at the air-water interface. J. Mater. Chem., 2000, 10, 1389-1393).

Chee et al. in light of Nie et al. and Jákli et al. in view of Bawendi et al., as applied to claim 11, teach a structure comprising a hydrophilic semiconductor quantum dot coated with a hydrophobic compound, but fail to teach the quantum dot coated with a compound of octyldecyl amine.

Damle et al. teach a semiconductor nanoparticle that may be rendered hydrophobic by immersing the nanoparticles in octadecylamine and creating a lipid film on the nanoparticle (pg. 1389, left col. first paragraph; pg. 1390, right col., second paragraph, first sentence), in order to disperse the particles on the surface of the water. It is noted that the nanoparticle is a semiconductor quantum dot because it is made from a semiconductive material.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the device of Chee et al., a hydrophobic quantum dot coated with a compound containing octadecylamine as taught by Damle et al., in order to provide a hydrophobic coating for stability of the quantum dot and stability of the fluorescence.

9. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al. and Jákli et al., and in view of Polak et al. (US 6,379,622).

Chee et al. in light of Nie et al. and Jákli et al., as applied to claim 25, teach a device comprising a semiconductor crystal coated with a hydrophilic compound and a substrate being a hydrophilic porous silica material, but fail to teach a probe attached directly to the porous material and a fluorophore and quenching moiety.

Polak et al. teach a semiconductor nanocrystal attached to a biomolecule, which is directly attached to a porous material, a fluorophore, and a quenching moiety (col. 6, lines 28-33,

47-54; col. 7, lines 32-44), in order to place a reference in close proximity to a fluorescent label and maximize emission intensity.

Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in the device of Chee et al. in light of Nie et al. and Jákli et al., biomolecules comprising a fluorophore and a quenching moiety attached directly to a porous substrate as taught by Polak et al., in order to prevent fluorescence when concentration of analyte is low.

10. Claim 97 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chee et al. in light of Nie et al. and Jákli et al.

Chee et al. in light of Nie et al. and Jákli et al., as applied to claim 1, teach a device comprising a semiconductor crystal coated with a hydrophilic compound and a substrate being a hydrophilic porous silica material, but fail to teach a porous material having a pore diameter from about 10 to about 50 nanometers. Nevertheless, it has long been settled to be no more than routine experimentation for one of ordinary skill in the art to discover an optimum value for a result effective variable. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum of workable ranges by routine experimentation" Application of Aller, 220 F.2d 454, 456, 105 USPQ 233, 235-236 (C.C.P.A. 1955). "No invention is involved in discovering optimum ranges of a process by routine experimentation." Id. at 458, 105 USPQ at 236-237. The "discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art." Since applicant has not disclosed that the specific limitations recited in instant claim 25 are for any particular purpose or solve any stated problem, and the prior art teaches that that pore diameters in a porous silica

material can be varied in order to accommodate different size nanospecies, absent unexpected results, it would have been obvious for one of ordinary skill to discover the optimum workable ranges of the methods disclosed by the prior art by normal optimization procedures know in the art of embedding nanospecies.

Response to Arguments

11. Applicant's arguments and amendments with respect to claims 1 and 53-58 have been considered but are moot in view of the new ground(s) of rejection. Applicant's amendments and arguments overcome the previous grounds of rejection. However, Chee et al. in light of Nie et al. and Jákli et al. teach the current embodiment of the structures. Chee et al. in light of Jákli et al. teach a hydrophilic porous silica material and Chee et al. in light of Nie et al. teach that a quantum dot (nonporous) coated with mercaptoacetic acid renders a quantum dot hydrophilic. The quantum dots are now considered the nanospecies having a first characteristic and has a diameter of less than 30 nm (col. 13, lines 54-56), which encompasses the recited range of about 1 to 20 nm.

12. Applicant's arguments and amendments with respect to claims 2-7, 9-27, 29 and 97-98, see page 24, have been considered but are moot in view of the new ground(s) of rejection. Chee et al. teach attachment of microspheres at discrete sites as argued by applicant. However, the structure of Chee et al. would be capable of attaching a plurality of non-discretely positioned nanospecies to a porous material because no further product limitations have been recited and Chee et al. teach the product limitations of claims 1 and 98 as described above. Applicant further argues that dependent claims 2-7, 9-27, 29 and 97-98 include every limitation of claim 1,

and are therefore allowable. However, for the reasons stated above, claim 1 is not allowable over the prior art.

13. Applicant's arguments regarding claims 59-96 and 99-110, see pages 25-30, have been entered, but have not been considered because the claims are withdrawn.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Yu whose telephone number is (571) 272-2933. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (571) 272-0823. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Melanie Yu
Patent Examiner
Art Unit 1641

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05/13/05